

# Solar Photovoltaic and Energy Efficiency Resources for Commercial Property Owners in the City of Encinitas

Prepared by the Energy Policy Initiatives Center, May 2020

The City of Encinitas Climate Action Plan (CAP) established a set of City initiatives which, once implemented, will reduce citywide greenhouse gas (GHG) emissions and achieve the City's climate goals, consistent with statewide guidance. If adopted by City Council, Ordinance 2020-04 would enact CAP measures BE-3 and RE-3 and establish the following requirements for commercial properties:

1. **Solar** on all new nonresidential, certain multi-unit residential, and hotel/motel buildings as well as existing non-residential, certain multi-unit residential, and hotel/motel buildings additions that increase total roof area by at least 2,000 sq. ft. or alterations with a permit value of at least \$1,000,000 that affect at least 75% of gross floor area.
2. **Energy efficiency standards** for all new nonresidential (including mixed use portion), certain multi-unit residential, and hotel/motel buildings as well as all existing non-residential, certain multi-unit residential, and hotel/motel building additions of 1,000 sq. ft. or alterations with a permit value of at least \$200,000.

This document provides information about distributed solar on commercial properties, the cost-effectiveness of the solar and energy efficiency portions of Ordinance 2020-04, options for renewable energy systems on multi-tenant commercial properties, and other related resources.

## Distributed Solar on Commercial Properties

Solar photovoltaic (PV) on commercial properties offer property owners financial strategies to reduce electricity costs and increase cash flow through cost savings. Generally, electricity rates increase faster than inflation incentivizing investments that control or decrease rising energy costs. Solar PV offers 25+ years of production at known costs that allow a commercial property owner to price hedge and budget against increasing electricity prices and/or electricity demand at an establish cost. Additionally, the capital investment in solar PV can be more quickly recouped through tax advantages that include accelerated depreciation of up to 85% in the first six years of operation and use of a one-time, dollar-for-dollar federal investment tax credit (ITC) of 26% in 2020, 22% in 2021, and 10% in 2022 and beyond. Commercial properties with solar may also generate renewable energy credits (RECs) through the Western Renewable Energy Generation Information System (WREGIS) and sell the RECs for additional revenue.

Where a commercial property owner has limited tax liability or insufficient access to capital, there are several loan and lease options where no upfront capital is required. These include:

- Financing through a conventional loan or a Property Assessed Clean Energy (PACE) Program;

- **Operating Leases:** On-balance sheet financing that counts as debt. Property owners can take the ITC tax and depreciation benefits and repay the capital cost over the term of the lease. Operating leases can include an option to purchase the system at end of the term;
- **Capital Leases:** Off-balance sheet financing where a third-party retains ownership and tax benefits and capital costs are repaid as a monthly expense that may be tax deductible. Leases may be renewed or system purchased at end of term; and
- **Power Purchase Agreements (PPAs):** A third-party owns and maintains the system with the property owner agreeing to buy solar production at a set price over a set term (e.g. 25 yrs).

### Cost-Effectiveness of Solar PV on Commercial Properties

Solar PV on commercial properties—new construction and major alterations—has been found to be cost effective. TRC Energy Services conducted a cost effectiveness analysis for four commercial building types in the same climate zone and utility territory as the City of Encinitas, using requirements identical to those being considered in the City’s ordinance.<sup>1</sup> The analysis compared upfront capital costs and ongoing maintenance costs with the savings associated with reduced electricity bills. In each scenario, the benefits of installing a PV system outweigh costs, as indicated by the benefit-cost ratio (BCR). Both new construction and major renovation projects across all building types analyzed have a BCR of 1.7 to 3. A BCR greater than one indicates a project where benefits are greater than costs over the period analyzed. Table 1 and Table 2 detail the costs and savings expected over a 15-year period. Because the expected useful life of a solar PV system is 25+ years and costs savings could occur for 10 years beyond the period considered in the analysis, it is likely that the BCR for these example projects would be higher (i.e., more savings relative to costs).

**Table 1. Commercial New Construction Solar PV Cost Effectiveness by Building Type**

| New Construction                      | Small Office<br>(5,502 sq.ft.) | Medium Office<br>(53,628 sq.ft.) | Warehouse<br>(49,495 sq.ft.) | Retail Strip Mall<br>(9,375 sq.ft.) |
|---------------------------------------|--------------------------------|----------------------------------|------------------------------|-------------------------------------|
| PV Size                               | 5 kW                           | 80 kW                            | 74 kW                        | 5 kW                                |
| Upfront Cost                          | \$10,650                       | \$171,341                        | \$158,137                    | \$10,650                            |
| Investment Tax Credit (ITC)           | (\$2,059)                      | (\$33,126)                       | (\$30,573)                   | (\$2,059)                           |
| 1st Inverter Replacement <sup>1</sup> | \$750                          | \$12,066                         | \$11,136                     | \$750                               |
| 2nd Inverter Replacement <sup>1</sup> | \$600                          | \$9,653                          | \$8,909                      | \$600                               |
| Annual Maintenance                    | \$100                          | \$1,609                          | \$1,458                      | \$100                               |
| Annual Energy Savings (kWh)           | 8,190                          | 131,764                          | 121,609                      | 8,190                               |
| 15-Year Net Costs <sup>2</sup>        | \$10,494                       | \$168,835                        | \$155,823                    | \$10,494                            |
| 15-Year Net Savings <sup>2</sup>      | \$27,682                       | \$346,008                        | \$272,625                    | \$22,026                            |
| <b>Benefit-Cost Ratio</b>             | <b>2.6</b>                     | <b>2.0</b>                       | <b>1.7</b>                   | <b>2.1</b>                          |

<sup>1</sup> Using an estimated useful life of 11 years for inverters.

<sup>2</sup> 15-year net costs and savings are discounted cash flows using a 3% discount rate.

<sup>1</sup> TRC (2019). [Carlsbad Energy Conservation Ordinance Cost Effectiveness Analysis](#). PDF

**Table 2. Commercial Major Alteration Solar PV Cost Effectiveness by Building Type**

| Major Alterations                     | Small Office<br>(5,502 sq.ft.) | Medium Office<br>(53,628 sq.ft.) | Warehouse<br>(49,495 sq.ft.) | Retail Strip Mall<br>(9,375 sq.ft.) |
|---------------------------------------|--------------------------------|----------------------------------|------------------------------|-------------------------------------|
| PV Size                               | 5 kW                           | 80 kW                            | 74 kW                        | 5 kW                                |
| Cost                                  | \$11,900                       | \$191,452                        | \$176,697                    | \$11,900                            |
| Investment Tax Credit (ITC)           | (\$2,301)                      | (\$37,014)                       | (\$38,873)                   | (\$2,301)                           |
| 1st Inverter Replacement <sup>1</sup> | \$750                          | \$12,066                         | \$11,136                     | \$750                               |
| 2nd Inverter Replacement <sup>1</sup> | \$600                          | \$9,653                          | \$8,909                      | \$600                               |
| Annual Maintenance                    | \$100                          | \$1,609                          | \$1,458                      | \$100                               |
| Annual Energy Savings (kWh)           | 8,190                          | 131,764                          | 121,609                      | 8,190                               |
| 15-Year Net Costs <sup>2</sup>        | \$11,503                       | \$185,057                        | \$166,083                    | \$11,503                            |
| 15-Year Net Savings <sup>2</sup>      | \$28,563                       | \$453,105                        | \$278,098                    | \$34,962                            |
| <b>Benefit-Cost Ratio</b>             | <b>2.5</b>                     | <b>2.4</b>                       | <b>1.7</b>                   | <b>3.0</b>                          |

<sup>1</sup> Using an estimated useful life of 11 years for inverters.

<sup>2</sup> 15-year net costs and savings are discounted cash flows using a 3% discount rate.

### Options for Renewable Energy Systems on Multi-tenant Commercial Properties

Landlords are able to use both 1) existing SDG&E rate schedules to allocate renewable energy generated from onsite solar photovoltaic systems to tenants on multiple meters and 2) existing market solutions to allocate benefits from onsite renewable energy improvements on their property.

#### Virtual Net Energy Metering (VNM)

In the past, it was difficult to allocate the energy from a distributed solar PV system to tenant accounts in multi-tenant buildings, which can include multi-tenant on a single meter, where each tenant has an individual electric meter. If a system was connected directly to multiple meters, there would be no way of ensuring equitable distribution of the generation. This resulted in some tenants benefitting more than others under existing net energy metering rules (NEM). Additionally, installing multiple systems for each tenant or load in the building is cost prohibitive.

In 2011, the California Public Utilities Commission (CPUC) authorized the use of Virtual Net Metering (VNM), which allows multi-tenant building owners to install a single solar system to cover the electricity load of both common and tenant areas, regardless of whether they are connected at the same service delivery point. The electricity does not flow directly to any tenant or common area meter, but feeds directly back onto the grid. SDG&E allocates the energy produced by the solar PV generating system to both the building owner's and tenants' individual utility accounts based on a pre-arranged allocation agreement. The intent of VNM is

to enable tenants to receive the direct benefits of the building's solar system in an equitable way that balances property owners needs and tenant benefits.

SDG&E's [NEM-V-ST](#) rate schedule enables VNM for multi-tenant buildings on a single meter and multi-meter residential, commercial, and industrial properties. A property owner submits an allocation agreement to SDG&E that automatically allocates pre-determined percentages of generation from the PV system to common area and tenant accounts each month. The generation allocated to each account is deducted from the total electric consumption for that month. NVM-V-ST operates on a 12-month true up timeline where excess generation is compared with consumption over the entire year to determine the electric payment or credit. SDG&E will apply any excess credit to a future bill or issue a refund check<sup>2</sup> upon request for any excess generation left at the end of the 12-month true up, if any. Bill credit calculation is determined by the applicable electric rate schedule of the qualified customer account. Additional information and forms can be accessed on SDG&E's NEM [webpage](#).

#### Net Energy Metering Aggregation

SDG&E's [NEM-ST Aggregation](#) rate schedule enables NEM for customers with meters located on properties adjacent or contiguous to the NEM-eligible generator (e.g. solar PV). NEM Aggregation allocates generation on a pro-rata basis that is adjusted based on each account's contribution to year-to-date usage for all accounts in the aggregated arrangement. It is applicable to residential, small commercial, commercial, industrial, and agricultural customers who use a renewable electrical generation facility that is located on the customer's owned, leased, or rented premises. The generation facility must be interconnected and operate in parallel with SDG&E's distribution system with the primary purpose of offsetting onsite load. Bill credits are based on the customer's applicable electric rate schedule at the aggregated account.

Additional information and forms can be accessed on SDG&E's NEM [webpage](#).

#### Market Solutions to Allocate Generation Across Multi-Tenant and Multi-Meter Commercial Buildings

Several market solutions exist depending on whether a building is master metered, submetered, or individually multi-metered buildings. If a building is master metered, where there is a single meter per building, or submetered, where the property owner not the electric utility owns the meters of individual tenants, the property owner can allocate solar generation to individual tenants through their monthly rent or through several software platforms that actualize the terms of their lease. Where buildings are individually multi-metered, existing

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<sup>2</sup> Note: Credit allocated up to 100% of a customer's consumption is credited at the customer's retail rate. Once the 100% of consumption is credited, any excess generation that results in a net surplus credit or Net Surplus Compensation (NSC) is credited on a rolling 12-month average of spot market prices that may fluctuate. Additional information can be found on SDG&E's [FAQ Sheet for VNM](#).

software platforms can allocate solar generation to these tenants electronically to implement the terms in each tenant's leasing agreements. Additionally, a property owner may also take control of all individually multi-metered units on its property and use the software platform to allocate excess generation to individual tenants as part of their lease agreements. In all cases, the property owner benefits from owning the system and using the ITC and accelerated depreciation of the asset to offset capital costs. Additionally, the property owner can provide electric cost certainty to tenants using leases and/or software platforms to allocate benefits of onsite renewable energy generation in the leasing terms. Finally, California Public Utilities Code § [218\(b\)](#) specifically defines the term "electrical corporation" to not include a corporation or person producing power from a non-conventional power source solely for its own use or the use of its tenants. California Public Utilities Code § 218(e) also expressly excludes "independent solar energy producers", defined under California Public Utilities Code § [2868](#), from the definition of "electrical corporation."

### **Cost-Effectiveness of Energy Efficiency Projects for Commercial Properties**

Energy efficiency requirements for commercial properties has been found to be cost-effective. TRC Energy Services and EnergySoft conducted a statewide cost effectiveness analysis for all climate zones and utility territories in California.<sup>3</sup> The analysis examined the cost-effectiveness of a potential energy efficiency package for three commercial building types with two different energy source configurations: mixed-fuel (i.e., a combination of electric and natural gas) and all-electric. In each case, the benefits associated with implementing the energy efficiency package outweighed the cost, as indicated by the net present values (NPV) and BCRs. Across all building prototypes, project NPVs range from \$4,900 to \$1.2m.

Table 3 and Table 4 summarize the energy savings (electricity and natural gas), net costs, and net monetary savings expected over a 15-year period for mixed-fuel and all-electric building types. For both mixed-fuel and all-electric buildings, costs only include those that are incremental to a natural gas baseline requirement (e.g., a mixed-fuel building compliant with 2019 state building standards). Negative net costs in Table 4 indicate that the incremental cost of an energy efficiency package will reduce upfront project costs for new all-electric construction relative to a mixed-fuel building that meets the minimum state requirements. Because the expected useful life of some energy efficient projects can extend beyond the period considered in the analysis, it is likely that the BCR for these example projects would be higher (i.e., more savings relative to costs).

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<sup>3</sup> TRC, EnergySoft (2019). [2019 Nonresidential New Construction Reach Code Cost Effectiveness Study](#). PDF

**Table 3. Commercial Mixed-Fuel Energy Efficiency Cost Effectiveness by Building Type**

| Mixed-Fuel Commercial            | Medium Office<br>(53,628 sq.ft.) | Medium Retail<br>(24,691 sq.ft.) | Small Hotel<br>(42,552 sq.ft.) |
|----------------------------------|----------------------------------|----------------------------------|--------------------------------|
| Electricity savings (kWh/yr)     | 41,817                           | 17,170                           | 5,352                          |
| Natural gas savings (therm/yr)   | (6)                              | 136                              | 424                            |
| 15-Year Net Costs <sup>1</sup>   | \$66,649                         | \$5,569                          | \$21,824                       |
| 15-Year Net Savings <sup>1</sup> | \$204,394                        | \$74,479                         | \$26,699                       |
| Net Present Value <sup>1</sup>   | \$137,745                        | \$67,910                         | \$4,876                        |
| Benefit-Cost Ratio               | 3.1                              | 13.2                             | 1.2                            |

<sup>1</sup> 15-year net costs and savings are discounted cash flows using a 3% discount rate.

**Table 4. Commercial All-Electric Energy Efficiency Cost Effectiveness by Building Type**

| All-Electric Commercial          | Medium Office<br>(53,628 sq.ft.) | Medium Retail<br>(24,691 sq.ft.) | Small Hotel<br>(42,552 sq.ft.) |
|----------------------------------|----------------------------------|----------------------------------|--------------------------------|
| Electricity savings (kWh/yr)     | 33,318                           | 14,350                           | (53,308)                       |
| Natural gas savings (therm/yr)   | 950                              | 522                              | 8,188                          |
| 15-Year Net Costs <sup>1</sup>   | (\$3,676)                        | (\$18,193)                       | (\$1,266,354)                  |
| 15-Year Net Savings <sup>1</sup> | \$256,704                        | \$127,461                        | (\$81,338)                     |
| Net Present Value <sup>1</sup>   | \$260,380                        | \$145,654                        | \$1,185,015                    |
| Benefit-Cost Ratio               | > 1                              | > 1                              | 15.6                           |

<sup>1</sup> 15-year net costs and savings are discounted cash flows using a 3% discount rate.

### Additional Resources for Property Owners

Property owners can find additional resources to help them understand these requirements and properly design their projects.

#### Solar Resources:

- California Public Utilities Commission (CPUC) Resources on NEM:
  - [Overview, Billing, and Existing Tariffs](#)
- CPUC Self Generation Incentive Program (SGIP):
  - [General Information](#)
  - [Applying for SGIP for SDG&E Customers](#)
- SDG&E Solar and Energy Efficiency Program Resources:
  - [Net Energy Metering Processes and Guides](#)
    - [Net Energy Metering Application Portal](#)
- Center for Sustainability (CSE) Solar Resources:
  - [Tariff and Interconnection Resources](#)

- [Incentive and Tax Credits](#)

#### Energy Efficiency Program Resources:

- SDG&E's Energy Efficiency Program
  - [Program Resources](#)
  - [Rebate Programs](#)
- CPUC Resources on Energy Efficiency:
  - [Resources, Information for Consumers, and Program Links](#)

#### Resources Related to Reach Codes:

- [California Energy Codes & Standards:](#)
  - [2019 Local Energy Ordinance Resources](#)
- California Energy Commission Title 24 and Local Reach Code Resources:
  - [2019 Building Energy Efficiency Standards](#)
  - [Online Resource Center](#)

#### Tax Resources:

- [U.S. Department of Energy Guide to the Federal Investment Tax Credit](#)
- IRS Resources for the Investment Tax Credit:
  - [Form 3468](#)
  - [Instructions for Form 3468](#)
- DSIRE [ITC Program Overview](#)
- Solar Energy Industry Association: [Solar ITC Fact Sheet](#)
- [Energy Sage Tax Credit Explained](#)